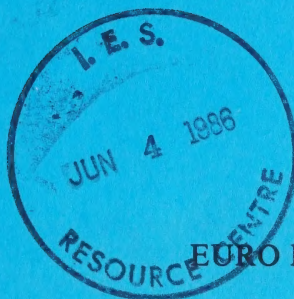


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Health and the environment

Report on a WHO meeting

The World Health Organization is a specialized agency of the United Nations with primary responsibility for international health matters and public health. Through this Organization, which was created in 1948, the health professions of some 160 countries exchange their knowledge and experience with the aim of making possible the attainment by all citizens of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life.

The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health problems of the countries it serves. The European Region has 33 active Member States,^a and is unique in that a large proportion of them are industrialized countries with highly advanced medical services. The European programme therefore differs from those of other regions in concentrating on the problems associated with industrial society. In its strategy for attaining the goal of "health for all by the year 2000" the Regional Office is arranging its activities in three main areas: promotion of life-styles conducive to health; reduction of preventable conditions; and provision of care that is adequate, accessible and acceptable to all.

The Region is also characterized by the large number of languages spoken by its peoples, and the resulting difficulties in disseminating information to all who may need it. The Regional Office publishes in four languages — English, French, German and Russian — and applications for rights of translation into other languages are most welcome.

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Health and the environment

Report on a WHO meeting

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The views expressed in this publication are those of the participants in the meeting and do not necessarily represent the decisions or the stated policy of the World Health Organization.

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INTRODUCTION

Throughout the European Region, not only the authorities responsible for health and the environment but also the general public are increasingly conscious of the importance of pollution, and many successful controls have been introduced over the last decade. There are probably fewer grossly polluted rivers and fewer cities with severe air pollution than there were 20 years ago. People are beginning to realize, however, that their health may also be influenced by some of the more subtle environmental factors that by their nature are more difficult to identify, evaluate and hence control. Furthermore, there may be combined effects as well as long-term effects that are even more difficult to quantify and assess.

To review the present and future management of the environment and its effect on people's health, the WHO Regional Office for Europe convened a consultation at the Regional Office in Copenhagen on 29 and 30 March 1983. In its report, the consultation recommended that a multi-lingual working group be convened towards the end of 1983 to review:

- (a) the current status of environmental health in the European Region;
- (b) future trends in environmental health in Europe and the need for international collaboration to help solve environmental health problems;
- (c) current strategies in environmental health;
- (d) the assessment and evaluation of environmental health risks;
- (e) the mechanism for priority setting (including social, psychological and economic considerations) in relation to environmental health risks;
- (f) the development of multisectoral policies and interdisciplinary research and management, with suitable mechanisms for coordination.

Acting on this advice, the Regional Office convened the present working group from 12 to 16 December 1983 in Vienna, with financial and advisory support from the Austrian Federal Government.

The Working Group consisted of 24 temporary advisers from 18 Member States of the Region. They were leading scientists from national public health institutes and universities, together with administrators from both national health and environment agencies. The Group also included representatives of the United Nations Environment Programme, the International Atomic Energy Agency, the Food and Agriculture Organization of the United Nations, and the International Agency for Research on Cancer. The list of participants is given in Annex 2.

The meeting was opened by Dr K. Steyrer, Austrian Federal Minister for Health and Environmental Protection, who pointed out that Austria for the last 12 years had had a joint ministry, which allowed the subjects of health and the environment to be closely linked. He said that the Austrian Government had given high priority to the protection of the environment and considered it to be of great importance for people's health and well-being. Mr J.I. Waddington, Director, Environmental Health, WHO Regional Office for Europe, welcomed the participants on behalf of the Regional Director, Dr Leo A. Kaprio, and thanked the Austrian Federal Government for its valuable support in hosting the meeting. He felt the venue was particularly appropriate because Austria was one of the few European countries to have a joint ministry of health and the environment. The outcome of the meeting would be particularly important in deciding on future priorities for WHO's European Region. The lessons learned in Europe should also be of value to less developed parts of the world.

The Working Group elected Dr E. Bobek, Director-General, Austrian Federal Ministry of Health and Environmental Protection, as Chairman. Dr U. Frey was elected Vice-Chairman and Dr N. Rosdahl Rapporteur.

Mr Waddington drew attention to the fact that the Member States of the European Region had adopted at the Regional Committee in 1980 a regional strategy for attaining health for all by the year 2000, and that prevention, including environmental factors, was an important element in this strategy. The meeting would serve an important purpose if it could help put the strategy into operation.

He also outlined the major components of the regional environmental health programme: water supply and sanitation, air and water pollution, radiation protection, chemical and food safety, and occupational health. In reviewing the role of the Regional Office in environmental health, resource limitations should be borne in mind, and the potential of the Office to act as a catalyst, challenger and stimulator should be emphasized. The importance of European collaboration with a number of intergovernmental organizations and agencies was also stressed, particularly CEC, CMEA and OECD.

ENVIRONMENT AND HEALTH: CURRENT STATUS IN THE EUROPEAN REGION

Environmental health in the European Region today can neither be considered in isolation nor evaluated as an entity. The variation in degree of development, industrialization, urbanization, population density, population growth, geographical conditions and other factors complicate direct comparisons between countries. There has been a recent tendency, when assessing the health conditions of a population, to consider factors such as lifestyle and social conditions as being of overwhelming importance, but caution should be exercised in not underestimating environmental factors. This is not only the case in the developing parts of the Region where obvious improvements in health have been and still are taking place through programmes of water supply and sanitation, but also in the more developed parts of the Region, which have been increasingly subjected to more subtle and long-term health hazards from environmental factors such as the proliferation of new chemicals.

Mortality

Throughout Europe, infant mortality has decreased and life expectancy increased. Infant mortality in particular has been, and still is, considered to be one of the most important indicators of the state of people's health and their conditions of hygiene. Such indicators are usually the result of a combination of environmental factors, social conditions, health services, lifestyles, etc. Differences in health conditions among countries or among various parts of the Region can therefore be attributed to a whole range of factors, which complicates deductions about the specific effect of the environment on health.

There should, however, be some procedure for assessing the impact on health of the environment, when examining specific causes of death. The number of deaths that can be attributed to gastrointestinal infections, for example, gives with a reasonably high degree of confidence an indication of the hygienic conditions of water and food, although it is also influenced by health education and lifestyle, as well as access to appropriate medical care.

A few causes of death are, however, of significant value in estimating the impact on health of the environment: they include accidents and notifiable industrial diseases. In the European Region, there is evidence of a halt in the previous increasing trend and maybe even a decline in deaths from industrial activity. There are still wide discrepancies, however, between countries, indicating the possibility of further improvement.

Traffic is still the main accidental killer. Improvements have, however, been observed in a number of European countries, especially since the

energy crisis of 1973 enforced a wider use of speed limits and a halt — at least temporarily — of the upward trend in individual car use. Further improvements will require concerted action in physical planning, in the construction of motor vehicles and in health education to change lifestyles and driving patterns.

Morbidity

The morbidity pattern in the European Region is influenced by many things, one of which is the fact that the Region has an aging population. This trend is seen in all countries of the Region, but appears more acute in the northern part of the Region where there has also been a marked decrease in the birth rate. The observed morbidity trend also reflects a change in people's inclination to seek advice from the health system with the lowered iatrotrophic threshold level. These are the two main factors that have increased the burden on the health services and they should not be disregarded when evaluating the impact of changes in environmental health risk factors.

Morbidity figures are, of course, closely linked with those of mortality. Although the burden on the health services might more easily be linked directly with morbidity figures, a number of other factors do relate morbidity with mortality. Nevertheless, when some 50% of deaths in the most industrialized countries can be attributed to cardiovascular diseases and about 20% to cancer, this of course is reflected in the morbidity figures. On the other hand a number of degenerative diseases, notably those of the musculoskeletal system, cause significant morbidity without having any influence on the mortality figures. The same is true for most psychiatric disorders.

The real significance of the environment for morbidity is difficult to assess. If, however, the environment is taken in its broadest sense, embracing air, water and food, the industrial environment, housing and traffic, it is evident that the impact is great. It may involve such major groups of disorders as:

- congenital malformations (and early fetal deaths);
- premature births;
- gastrointestinal infections (and poisoning) in both children and adults;
- respiratory diseases;
- accidents (traffic, industrial, in the home and in leisure time);
- musculoskeletal diseases stemming mainly from hard physical labour;

- cancers through exposure to factors in the industrial or external environment, indoor climate, nutrition, etc.;
- stress symptoms including psychosomatic diseases and disturbed sleeping patterns;
- degenerative diseases of the nervous, hepatic and renal systems primarily due to industrial exposure;
- acute poisoning from chemicals; and
- cardiovascular disease, influenced for example by soft water.

The present system of health statistics makes it impossible to measure the extent to which each of these groups of disorder is caused by the environment; nor does it show specifically whether things are getting better or worse. In a few cases, however, there seem to be some discernible trends. In some countries, for instance, there seems to be an increase in the notification of congenital malformations, although it remains to be proved that this is in fact a true increase (due to a higher chemical and physical burden on the fetus) rather than a reflection of better statistics and increased awareness of the problem among health personnel. Furthermore, an increase in cancer incidence (after the necessary age adjustment) has been reported. This holds true even when the figures are adjusted for changes in notification systems and after cases are excluded that can be attributed to changes in lifestyle such as tobacco and alcohol consumption. Also in some countries an increase has been apparent in reported cases of cerebral degeneration, probably due to exposure to organic solvents. On the other hand, it has been shown that some kinds of morbidity such as that caused by industrial accidents and traffic can be controlled by rigorous measures.

Various sources of pollution and their trends in Europe are fairly well mapped. It is obvious that some of the more well established pollution sources have been recognized and control measures are being developed. This applies in the case of pesticides, for example, although the overall situation in the Region is not considered to be fully satisfactory. In other instances, national and international bodies are trying to establish estimates or more exact data on the degree of pollution from various sources, and its impact on people and the environment. One important aspect of such work is that the nature and magnitude of hazards from well known pollutants are becoming better understood, for example the effects of vehicle exhaust gases. At the same time, new potential risk factors are being identified, for example from biotechnology and nonionizing radiation.

However, much already well recognized pollution has an effect on people's health that is still not fully understood or appreciated. For example, noise, regardless of source, still poses major problems for people's

health and wellbeing. The obvious physical effect of hearing loss is well recognized, but the more subtle effects such as stress from lower levels of noise have been far more difficult to control effectively. This has been due to the difficulties in supplying legislators and administrators with hard quantitative data on the health and welfare implications.

Gaps in environmental health data

There are serious shortcomings in the present system of data collection and fundamental improvements are needed. The deficiency begins with the provider of the data — the health worker, particularly the physician — who should be made more aware of the potential hazards of the environment and who should accept responsibility for drawing the attention of public health authorities to environmental factors that might be a health risk. At present, physicians in general practice are not always well trained to recognize the symptoms of occupationally-linked conditions, for example. The national authorities responsible for the collection, collation and dissemination of data should also recognize the need for better health statistics. The data will then help the health and environmental authorities to set scientifically sound priorities for environmental health improvements.

An important point to be borne in mind when making international comparisons (as well as when evaluating trends within a country) is the need for age-adjusted figures. Other adjustments may also be important, but they are not well enough developed or refined to be of standard use.

Although it is evident that better statistics are needed, much could obviously be achieved with existing data, if they were made more easily accessible and if their collation and dissemination were geared more to the people who use them. Such improvements would greatly enhance comparability both historically and within and among countries. An important prerequisite for achieving this goal will be to identify the shortcomings in existing systems, to identify the available expertise at all levels, and to strengthen its capability through training. This should be done nationally and internationally and WHO will have an important role in the international collection, collation and dissemination of data.

To make better use of existing data and to make it more accessible, much more use could be made of appropriate modern data technology. Wider use of computers will, no doubt, greatly facilitate the evaluation of environmental health hazards and hence create a more solid basis for decision-making by the public authorities. This technology would also help individual Member States to complement their inadequate national data with information gained in other countries and/or by intergovernmental organizations. An inventory of these data would be of great value

and would help minimize the duplication of work, which wastes resources and time. One useful international data base that already exists is the International Register of Potentially Toxic Chemicals (IRPTC).

Much benefit could be gained from coordinating data from different sources, such as the medical field and various basic sciences, through electronic linkage. The importance of the notification of clinical observations and potential environmental health effects has already been stressed. It is essential, however, that such observations be stored in such a way that they are easily retrievable. This is a basic condition for the advancement of relevant epidemiological and toxicological research. It is equally important that existing epidemiological and toxicological information is made easily available to facilitate the evaluation of new clinical observations. It is evident that only if clinicians are supplied with adequate, reliable and speedy feedback on their observations of suspected causality, will they be motivated to cooperate actively and report to health authorities.

The way in which data are obtained will to a certain degree depend on the structure of a society and its health services. Sources of information other than the health services should also be considered. For instance, public and private pension schemes receive a vast amount of useful information, for example requests for disability pensions, compensation claims for death before pension age and claims for ill health associated with environmental conditions. Such pension schemes could provide valuable information on many aspects of the environment and health, although there may be serious gaps in information on the exact amount of past exposure. Various industries, in particular the chemical industry, generate, retrieve from other sources, store and collate information relating to their products and production processes. This information would also be extremely useful if made available to public authorities, if ways could be found to deal with the problem of confidentiality. Cancer registries should be used to the maximum and efforts should be made to harmonize them. WHO could play a significant role in finding ways and means of using these sources of health-related data for the benefit of people's health.

With the continuing industrialization of Europe, the impact on community health of more esoteric and subtle environmental insults becomes increasingly difficult to assess. This difficulty is exacerbated by the present deficiencies in health-related data, often due to the lack of appropriate health criteria and uncoordinated systems of data collection. Some well known environmental factors are partially controlled but new ones are continually emerging. There is not enough fundamental data to assess the magnitude of the problem or to estimate the quantitative risk of new hazards. It is imperative therefore to exploit more efficiently both existing and new sources of data and to combine information from many sources.

TRENDS IN ENVIRONMENTAL HEALTH PROBLEMS

The European Region is vast and comprises 33 Member States at widely differing stages of development. The degree of industrialization and urbanization differs considerably and so does the rate of change in different countries. A generalized statement on the future evolution of environmental health problems cannot therefore be made. Some major components of future trends can nevertheless be identified.

In the less developed parts of the Region, urbanization is increasing and is likely to continue doing so. The implications in terms of land use and housing conditions, as well as drinking-water supply and sanitation for growing conurbations, may have a considerable impact on people's health. Similarly, the increasing centralization of food supply, meaning that a growing proportion of the population will not be eating locally produced food, will necessitate more stringent food safety regulations. A further increase in the number of road vehicles is to be anticipated and the most important immediate impact is likely to be traffic accidents, although air pollution and noise will also tend to increase. The anticipated increase in industrialization in these countries, predominantly in heavy manufacturing, will inevitably result in more air pollution and greater discharges of solid and liquid waste with potential risks to both surface water and groundwater resources. While industrial development will introduce additional occupational health risks, some of the traditional risks primarily caused by hard physical labour in the agricultural sector may be alleviated by modernization. The trend in agriculture may well follow that seen elsewhere in Europe, with more intensive land use and greater use of chemical fertilizers and pesticides which have an impact on the environment.

In the industrial parts of Europe it is unlikely that urbanization will continue to any significant degree. In fact, the present trend is for people to move out from the city centres to suburban areas, leaving "dying" city centres with increasingly poor housing facilities for the underprivileged left behind.

In the northern part of Europe, energy conservation leads to more insulation and less ventilation which might — particularly in combination with new building materials that are often not assessed from a health point of view — result in a worse indoor climate.

Intensive agriculture, depending on massive use of fertilizers, has spread to most countries of the Region. The effects on both groundwater and surface water, including some marine waters, resulting in an increased content of nitrate, phosphorus and organic material, are already considerable. The agricultural communities of a number of European countries have recently shown some signs of awareness of the inherent dangers of these trends.

The nature of industrial activities in the more industrialized parts of Europe is likely to change substantially in the remaining years of the century. All industries will increasingly be forced to comply with the following conditions due to economic constraints and regulatory forces imposed *inter alia* to safeguard the environment:

- minimum consumption of energy and raw materials
- maximum recycling of materials
- minimum waste discharges and emissions, to save materials and to protect the environment
- reduced use of the human labour force and increased use of automation.

New biological and electronic technology in industry and in the expanding service sector may create new industrial hazards and, in the case of biotechnology, environmental hazards as well. On the other hand, automation and further mechanization might reduce some of the classic industrial hazards. In some instances, new biotechnology may turn out to have less impact on health insofar as it will replace the existing chemical industry. However, a greatly diversified output of new chemicals and products can be envisaged.

Production will probably tend to become more specialized and centralized, with a resulting increase in the transport of new materials, intermediate and final products and wastes. This, combined with a high demand for individual mobility, is likely to result in rising traffic levels, with the possibility of increased noise, air pollution and accidents.

Energy consumption will continue to be high, despite efforts to reduce it in industry and in homes. In the case of rising production of electricity this can for all practical purposes only take place through a greater use of fossil fuels and/or nuclear power.

There is likely to be a general movement of the labour force out of primary production and into the service industries and the proportion of sedentary white-collar workers will increase. With the development of electronic information transfer systems, many people may carry out more of their work in isolation at home, away from a sociable work environment.

Risk factors in the industrial environment

Mechanical risk factors will decrease owing to more effective training and safer machinery, together with automation, the introduction of new technology such as robots and the use of new electronic control systems. The number of small-scale industrial accidents is therefore likely to decrease, as

will the degenerative diseases of the musculoskeletal system caused by chronic hard physical labour. However, large-scale accidents may still occur with low to very low frequency. New ergonomic problems may arise with computer-based technology, particularly when the work requires constant visual alertness.

Specific physical risk factors such as noise, vibrations and external pressures may be more successfully controlled with new technology. With the expanding use of ionizing and nonionizing radiation, people will require a continuing high degree of protection and in particular the new health implications of nonionizing radiation may require new approaches. Special precautions against thermal factors in the industrial environment may be necessary, as the exploitation of natural resources in arctic areas is likely to become more common.

Chemical risk factors will remain a major concern owing to the steadily increasing use of chemicals. The problems of acute and semi-acute poisoning that used to be of prime concern are being superseded by the problem of long-term exposure to combinations of a great many chemicals at low concentrations in the air, food and water and through the skin. Some potential health hazards will thus be conditions with a long latency such as cancers and chronic nervous system injuries as well as mutations, teratogenic effects and allergies.

Biological risk factors related to classic infectious diseases are effectively under control in most countries of the Region. New hazards may be caused by the appearance of resistant strains of bacteria and adapted viruses as well as changes of immunocompetence in populations, induced by chemical injuries. Furthermore, modern biotechnology may introduce new hazards, including allergies.

Psychological and psychosocial risk factors are likely to become relatively more prevalent as physical risk factors are partially eliminated. Psychological adaptability will be of increasing importance to almost the entire workforce, particularly if a large proportion of the information that will become an increasingly important part of future production is produced in homes with modern electronic technology.

General comments

The most industrialized countries will probably experience these effects earlier than the rest of the Region, although all Member States will be exposed to such problems before the turn of the century.

An important point about the evolution of new technology is that it will only partly replace existing industries. Those that can still compete with the newer technology will remain, although it is likely that they will move to other locations offering cheaper labour and raw materials and less stringent regulations about industrial and environmental protection. There is a danger therefore that the highly industrialized countries may export some of their environmental health problems to less developed countries.

ENVIRONMENTAL HEALTH RESEARCH AND RISK ASSESSMENT

Research in various disciplines such as biology and epidemiology has had a significant impact on the evaluation of environmental health and on the possibilities for regulatory action.

When assessing the risk to people's health from the environment it is important to consider not only all sources of exposure, but also the characteristics of populations and individuals (health status, age, heredity) as well as their lifestyle (nutrition, social habits, etc.).

Methods of assessing risk include toxicity testing on animals, epidemiological studies and various forms of mathematical modelling. All these methods have constraints. Some limitations are well known, such as the differences in susceptibility from one species to another; others are less understood (for example nutrition) and some are still not generally recognized, such as the question of receptor activity. Even where the limitations are well recognized they may still not be generally taken into account. Constraints on the establishment of the scientific basis necessary for decision-making in environmental health include the heterogeneity of the populations under study, the difficulties of extrapolating from animal experimental models to people, the problems of predicting chemical toxicity from structure/activity relationships due to biological variation, and the problems of biological relevance when substituting animal studies with mathematical models.

Existing scientific knowledge in environmental health and in particular in risk assessment is limited by six problems:

- difficulties in identifying hazards
- limitations of analytical methods
- limitations of the epidemiological approach
- inadequate understanding of environmental disease processes

- limited understanding of biological defence and activation systems
- lack of identification of many biological acceptors that act as targets for toxic reactions.

The specific problem of biological variation was discussed in detail. This problem has a bearing both on the assessment of risk through epidemiological methods and on the use of animal experimental models. Man is genetically a markedly heterogeneous species. People's response to drugs varies by one order of magnitude, and the same may also be true of their response to toxic chemicals, including carcinogens, as the detoxication and activation enzyme systems are basically similar to the drug-metabolizing systems. The same genetically-based differences are found, to a lesser extent, in acceptor responses.

There are other variations in the susceptibility of human populations to environmental chemicals, and they can be found in different groups such as pregnant women, the elderly, neonates, and patients with allergies, predisposing disease and genetically determined enzyme deficiencies. Nutrition and diet have an important influence on people's susceptibility to toxic substances, particularly when it comes to multiple effects.

Species and strain differences and the extrapolation from animal toxicology data to human health risk pose great difficulties. Species differences in susceptibility to toxic substances are linked primarily to differences in the metabolic pathways, in the kinetics of disposition and metabolism, and in acceptor concentrations and affinities. The problems of extrapolating from the results of high-dose animal studies to the risk of low-dose exposure to people have not yet been resolved in a scientifically satisfactory way.

The recent development in cellular test systems for both human cell and other cultures has improved the evaluation of the hazards of chemical substances, although these *in vitro* techniques all have their limitations.

Multiple effects

One of the major problems in evaluating the risks to people's health from environmental hazards is identifying the major causal agents. Various environmental substances and other factors, such as those related to lifestyle, may all interact with each other by addition, synergism or antagonism. The combined effects of different chemicals may exert their influence at the enzyme level, in relation to ingestion and excretion, as well as in modes of biological disposition.

One of the most important combined effects is that of exposure to chemical substances together with tobacco smoking. Nutritional status and dietary habit also have profound effects on the toxicity of environmental chemical substances. A number of other factors are less well

studied. There are indications that stress, for example due to poor housing and neighbourhood, may influence the impact of environmental chemicals.

A review of the present status of research in environmental health, particularly the evaluation of risk from chemicals, indicated significant gaps in information in various fields of biology and epidemiology. However, major breakthroughs in some areas of research are likely to occur in the near future. New information about genetically derived individual sensitivity could be available within a few years. This would enable individuals to be identified who have an inherent increased susceptibility to environmental health hazards, and allow specific action to be taken to protect particularly susceptible individuals from specific hazards, e.g. by advising them not to take up a trade in a certain industry where they would be at special risk. This might, however, have serious ethical and other unfortunate consequences. While having initial beneficial results for the susceptible individual it might result in a more lax attitude to safeguarding the environment, including the industrial environment, which could lead to less secure conditions for the rest of the population.

Research into the factors that increase people's resistance to environmental insults, such as lifestyles and especially nutrition, may also yield significant results within a few years.

Research in environmental health should stress the links between clinical observations, epidemiological studies and basic biological experiments. Linking environmental exposure data to studies on the effects on people's health is important, because it helps to evaluate the relevance of each of the many factors — both environmental and other — that could impair people's health.

RISK ASSESSMENT IN ENVIRONMENTAL HEALTH

The following definitions of hazard and risk taken from a UNEP publication^a were accepted by the Working Group.

Hazard (of chemical) is the probability that a given chemical will produce an effect detrimental to health in conditions under which that chemical is actually

^a English-Russian glossary of selected terms in preventive toxicology. Moscow, IRPTC/UNEP, 1982.

manufactured or used. [Chemical might be substituted by product, or psychical or biological phenomenon.]

Risk is the expected frequency of undesirable effects arising from a given exposure to a pollutant. It is a mathematical concept relating to the expected seriousness and/or frequency of adverse responses arising from a given exposure to a substance. *Populations at risk* — the group of the working population likely to be the most affected by a given exposure or which is exposed to high concentrations at which adverse effects may occur.

Risk evaluation is a precise quantification of the available scientific evidence. Risk assessment is a less precise quantification of the scientific evidence and does not include the validity of the scientific knowledge, but includes all other aspects of the problem, such as the number of individuals at risk and cost-benefit analysis.

There is an urgent need to clarify the concepts of hazard and risk, whose meaning may differ in various European languages.

Scientific basis for risk assessment

In many instances, scientifically reliable decisions cannot be made in risk assessment because fundamental research is lacking. Nevertheless decisions have to be made within a limited time-scale by national administrations on the basis of available evidence whether or not it is scientifically sound. It is vital therefore that all relevant information should be readily available in an accessible form for decision-makers.

Important requirements in research include studies on the development and evaluation of methods for risk assessment and for predictive evaluation; further research into the relationship between environmental exposure and factors such as lifestyle, nutrition, housing, genetically derived individual sensitivity, and psychology; more research in basic and applied biological disciplines; stronger collaboration both nationally and internationally among all fields of medical and biological sciences related to environmental health; and the expansion and coordination of clinical and epidemiological investigations to help identify environmental hazards and prevent them.

Perception of risk and acceptable risk

It is vitally important to establish scientifically sound risk assessment that decision-makers, those at risk and the public can understand and accept. It will often be difficult to agree on what is scientifically sound, as some people will be reluctant to accept administrative and legislative actions

that cannot be backed by solid scientific facts, while others will support intervention on the basis of more or less well documented fears of health effects, without waiting for conclusive evidence.

The perception of health risks differs considerably. There may, for instance, be a tendency for the same environmental health problem to be regarded with greater anxiety in the more highly developed countries than in the less developed countries. The same might be true within a single country. There are indications that the more educated and more affluent sectors of the population in some countries tend to accept environmental health risk less readily than do other segments of the population. This makes it very difficult to establish a common national "perception of risk level" and makes it virtually impossible to achieve internationally.

The perception of risk can differ considerably, depending on the nature of the risk. The classic example is smoking: a large number of people apparently voluntarily accept a considerably increased risk to their health while they will not accept much lower risks from the pollution of water, air or food, and might not even tolerate alleged environmental health risks that have not even been scientifically proven.

These facts should not be disregarded and environmental health administrations and scientists working in the area should be aware that the process of risk assessment, although in principle primarily based on scientific evidence, will inevitably be influenced by the perceptions of risk of decision-makers, the media and the public.

People may interpret the concept of "acceptable risk" in different ways depending on their background. For example, most car drivers and passengers seem to accept the risk of serious injury and even death from traffic accidents, whereas they might not consider the current lead content in petrol as an acceptable risk. Personnel and those involved in environmental health management may likewise have different perceptions.

A specific problem is the perception of risk where extremely unlikely events are concerned. Highly subjective views may be influential or even decisive in decision-making, for example in relation to energy generation. Nuclear power production has an extremely low probability of serious radioactive release. It may, however, under the worst possible circumstances, have very serious effects. By comparison, electricity production in conventional power stations using fossil fuels can cause limited but potentially harmful effects on health on a continuous basis, together with possible indirect effects a great distance from the source.

Where new technology and entirely new products are introduced, the available information on which to base risk assessment will be limited, and hence subjective considerations are likely to play a substantial role in decision-making.

The media have a significant role in influencing the perception of risk among decision-makers and the public and it is important that

decision-makers communicate both with the media and directly with the public. It is essential for scientific data to be made more readily available and the risk assessment process should be made progressively more transparent so that unwarranted fears can be allayed. Unnecessary secrecy and reluctance to communicate can cause mistrust, the persistence of false perceptions of risk and delays and non-cooperation in the achievement of worthwhile objectives.

Risk assessment and management

Risk assessment encompasses decision-making in the sense that the whole process inevitably leads to decisions about administrative and/or legislative action. It involves a broad spectrum of participants from government, the private sector, the health services, the media and the public. It is by nature multidisciplinary and it should be a continuous, dynamic process.

A Planning Consultation organized by the WHO Regional Office for Europe in November 1983 considered the issue of risk assessment (Annex 1). Although this Consultation considered a somewhat narrower area of risk assessment, i.e. that of chemicals, the principles of the recommendations and of the description of a risk assessment model and process are to a considerable extent applicable to the entire field of environmental health.

As not all potential environmental health problems can be tackled at once, owing to cost and manpower limitations, a system of priority-setting must be instituted. It is particularly important that, both nationally and internationally, measures should be adopted and generally accepted to make the identification of potential health risks from new environmental factors more systematic. All the interest groups referred to above need to be involved and consulted in decision-making. The final decision will be reached more easily if the national environmental health policies that have been adopted are generally accepted by the public as well as the scientific community and the health professions. New developments in technology, new biological discoveries and new observations generated in clinical medicine and epidemiology may change priorities and hence influence these national environmental health policies.

The interaction between science (including medicine), environmental health administrations and the public (including the media) as well as politicians, is very important when new discoveries pertaining to environmental health are being made in science. An open approach to the media would help to increase informed public awareness.

In some instances, however, scientists need to take a more cautious approach when informing the public about recent research developments, as the public can be confused and unnecessarily alarmed by unbalanced statements taken out of context. In risk assessment there are likely to be differences of opinion on the interpretation of research findings. Where

such controversies cannot be resolved, it is advisable to present the conflicting views to the ultimate decisions-makers, the politicians. Whether it is a good idea to involve lay opinion in the evaluation process itself is debatable. Nevertheless, consumer groups, representatives of unions, etc. should be consulted during the risk assessment process in accordance with the figure in Annex 1.

The question of how to assess the risk to population groups with differing susceptibilities is likely to be increasingly significant as future research identifies specifically sensitive individuals and/or groups. Such a possibility could cause a clash of interests, as some people may wish to assess the risk according to the susceptibility of those not particularly at risk (thus establishing environmental health criteria that disregard specifically vulnerable individuals) and others will undoubtedly wish to adopt environmental health criteria on the basis of the vulnerable individuals. This is a difficult problem, which is by its nature political and has important ethical considerations. It is likely to have a particularly crucial bearing on occupational health.

For drinking-water and ambient air, however, the aim of society should be to establish environmental health criteria to protect the most vulnerable individuals. In the case of individuals hypersensitive to certain food additives, regulations for labelling, giving the necessary information and an appropriate warning, should give sufficient protection.

Given their diversity and complexity, both negative and positive factors should be taken into account in the risk assessment process. It is important when evaluating a new technology or a new product to take into account what it will be replacing and whether this will reduce any environmental health impacts. Both direct and indirect effects should be taken into consideration. Indirect effects may include psychological and psychosocial elements.

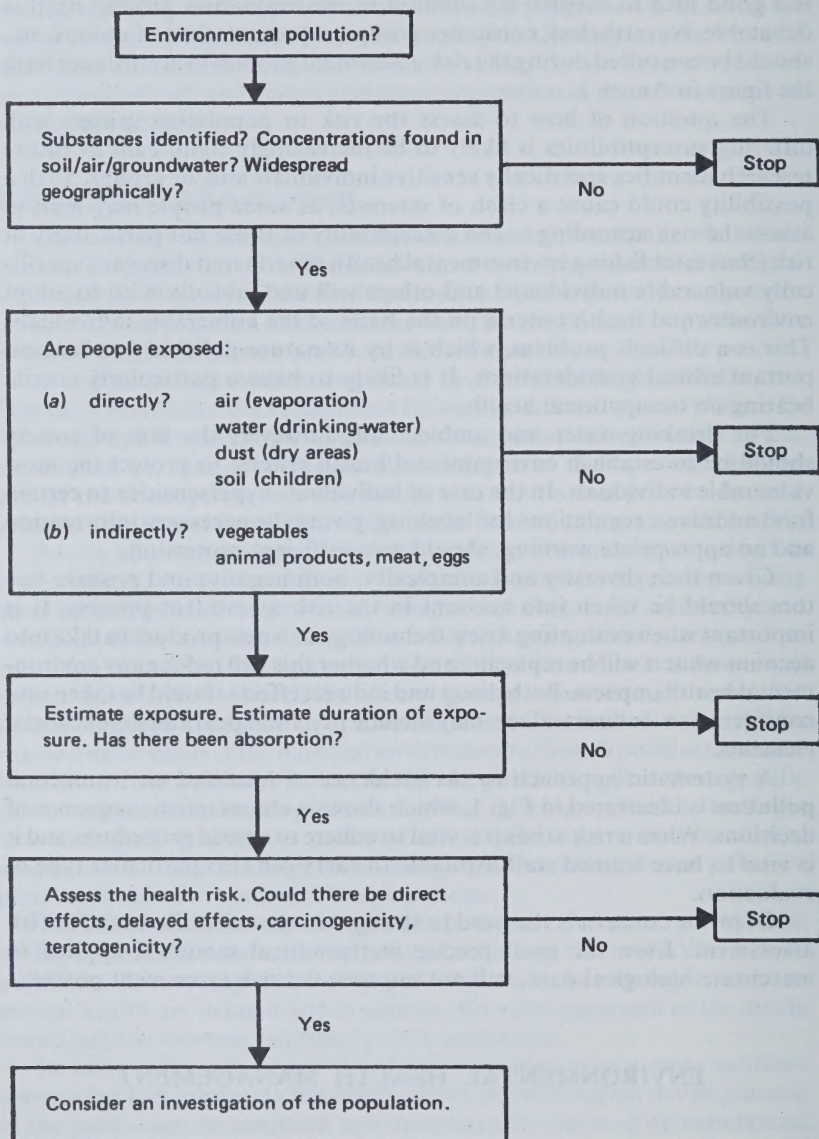
A systematic approach to the incidence of localized environmental pollution is illustrated in Fig. 1, which shows a characteristic sequence of decisions. When a risk arises it is vital to adhere to agreed procedures and it is vital to have trained staff available to carry out this particular type of evaluation.

Of prime concern is the need to strengthen the scientific basis for risk assessment. Even the most precise mathematical model, if applied to inaccurate biological data, will not improve the risk assessment process.

ENVIRONMENTAL HEALTH MANAGEMENT

The public's concern about environmental issues, which has been increasingly apparent throughout the European Region, has been accompanied

Fig. 1. Assessing the health risk from pollution



by a substantial extension of national environmental legislation and by an expansion of national administrative bodies to deal with the protection of the environment and with environmental health. Individual Member States have each chosen their own method of procedure. In many instances, however, increased political concern has resulted in the establishment of new ministries and/or new agencies responsible for various aspects of environmental protection, and in other cases, major regroupings of responsibilities for environmental health have taken place among existing governmental bodies.

The legislative reforms in environmental protection that have taken place in many countries have had two main aims. One is the protection of flora and fauna and is often closely linked to the question of land use and physical planning. This in turn is linked indirectly to people through the recreational use of the countryside and because of the importance for people's health and wellbeing of the distribution of land for residential, industrial, agricultural and recreational use. The other aim has more to do with traditional public health concepts, as its prime concern has been safeguarding people's health by protecting the water they drink, the food they eat and the air they breathe.

While the two aims are interrelated and in reality inseparable, different emphasis has been placed on them. In some mainly less developed countries, it might be considered an unwarranted extravagance to introduce measures that could be expensive or even completely block industrial development schemes otherwise considered imperative for social reasons. In other countries the importance of retaining recreational and wilderness areas, with careful protection of indigenous flora and fauna, might in some cases be an overriding priority. It seems, however, that an increasing emphasis is now being placed on people's health in the administration of environmental protection. There is no reason why this should be regarded as incompatible with the need to protect the ecosystem as a whole; indeed it is unlikely that a high level of human health can be sustained indefinitely in an environment that is markedly deteriorating under the impact of chemicals and other hazards.

Administration of environmental health

As already mentioned, Member States have distributed administrative responsibility for environmental health in different ways. Areas of responsibility change from time to time, but within Europe one country has 9 ministries involved in environmental health (excluding industrial health) and 12 countries have 6 or 7 ministries. The ministries responsible for emissions and discharges from industrial plants include agriculture and forestry, transport, public works, pollution control, internal affairs, industry, employment, and housing and development. In most countries,

however, the controlling body is either the ministry of the environment or the ministry of health.

This national diversity of administrative patterns reflects only partly the political and socioeconomic differences between Member States. There is a wide diversity of organization in the way powers are delegated to regional and local levels of government. Furthermore, the degree of decentralization within one country may vary from one sector to another: in some areas power may be delegated to decentralized state authorities while in others it may go to locally elected authorities. In addition, the geographical area covered by one decentralized authority may not always coincide with that of another decentralized authority responsible for an adjacent environmental health field.

Multisectorality in environmental health

From the plurality in the administration of environmental protection and environmental health described above, it is evident and understandable that different government departments assign different priorities to these fields. Where a ministry's main objective is to promote and facilitate economic development, there is bound to be a clash of interests with government departments and agencies whose main responsibilities are regulatory. Yet experience in many countries has shown that a considerable degree of external regulation is required in both public and private sectors of development.

Many sectors of government inevitably have an influence, both positive and negative, on environmental health. There are close parallels in other government functions and there is therefore nothing unique in the difficulties of coordination in the environmental sector. It would not be useful to attempt to devise specific solutions on an international basis, but the Regional Office should continue to carry out and publish comparative surveys of administrative structures within its Member States. Although each country will have to develop its own detailed mechanisms of coordination, which will differ substantially from country to country, such coordination is vital to safeguard people's health against environmental changes in a cost-effective and timely manner.

Land use and physical planning

Particular concerns include the location of residential areas near land used for industrial purposes and the influence of urbanization and changing agricultural practices on the quality of water resources. Non-point sources, such as the rapidly increasing concentration of nitrates being leached from farm land, are an important cause of pollution and potentially bad for people's health. The design of urban infrastructure and of housing still

does not take into account the effects on people's health of noise, pollution and living space. Systematic processes should be developed to assess the impact of the environment on health.

Control of environmental hazards

A number of regulatory authorities responsible for air and water pollution, noise control, radiation protection and occupational health deal with potential hazards arising from individual industrial plants. Decision-making and advice in any of these areas require a combination of technical expertise and knowledge of environmental health considerations, which is often interdisciplinary and multisectoral in nature.

Often the control of a specific environmental hazard, such as a chemical, will involve a variety of sectors, as the chemical may have a variety of sources, including agriculture, industry, energy production or municipal waste. In other instances, different people may handle a specific substance at various stages of its production, use and disposal and thus a number of different authorities, whose efforts are not always effectively coordinated, may be responsible for it.

In occupational health there is often a lack of coordination between the occupational and general health services, with no harmonization or integration of health statistics, notification of procedures or the system of prevention and care. Occupational health should form a much more prominent part of the general training of physicians.

New products and chemicals

Although the environmental health hazards from the 60 000 chemicals at present being produced are not fully understood, there is a special need to concentrate on the systematic screening of new chemicals and products, so that adequate and timely control can be exercised to protect both people's health and the environment. Not only is there a need to evaluate toxicity, but also to review the predicted extent and nature of use and hence the potential hazards to workers, consumers and the public. This inevitably requires intersectoral coordination, in spite of difficulties such as confidentiality of data, so that rational decisions can be made about the criteria for risk assessment and the timing and extent of any necessary regulations.

New technology

In view of the rapid development of new technology, a system of environmental health impact assessment needs to be set up on a multisectoral basis, so that governments can identify, as early as possible, the potential effect on vulnerable groups and the public of such technologies. It was

noted that the Regional Office had recently carried out studies on the impact of biotechnology and alternative energy sources on health.

Monitoring and surveillance

Immense efforts have been made in the European Region, particularly in the last 20 years, in the fields of environmental monitoring and surveillance. While much more is known now about the state of the environment than before, monitoring programmes have sometimes lacked clear objectives and there has often been no overall strategy. Environmental monitoring for the sake of people's health has special requirements: it should show total body intake and identify the environmental pathways to man. At present, it is unusual for one government body to be responsible for all the elements of this monitoring. Hence the monitoring network must be carefully coordinated if it is to provide all the necessary information in a timely and cost-effective manner. It must also take into account changing needs and reconcile them with the necessity for monitoring important long-term trends.

It is clear that epidemiology should be an increasingly important tool for rational decision-making. Its practical and systematic application to problems involving chronic, long-term effects requires careful coordination among the agencies responsible for health care and environmental protection, if it is to be cost-effective and productive.

Research

Research will continue to be needed in toxicology and epidemiology, particularly on new products and chemicals, and on monitoring and surveillance. Lack of intersectoral coordination in these and other research areas could seriously prejudice their effectiveness and prevent the best use of limited resources.

Communication with the public

There is an increasing need for all sectors involved in environmental health to improve their communication with the public. People are being bombarded with conflicting information about alleged threats to their health from various environmental agents. This information comes from a variety of sources and understandably both confuses and alarms the public. Responsible agencies, including education departments, must improve the public's understanding of relative risk and coordinate, as far as possible, their means of communication with the public as well as the context of specific statements and information in general.

General comments

Experience in the administration of environmental health services in most countries indicates that its multisectoral approach is most likely to be retained. Nevertheless, the integration or harmonization of regulating mechanisms should be encouraged as much as possible. Appropriate coordination is essential, regardless of the government structure, to ensure that health is taken into consideration in all sectors of government.

To facilitate this process, national environmental health policies should be developed that can help in developing and evaluating coordinating mechanisms. In setting out these national environmental health policies, the emphasis should be on primary prevention. The development of these policies could provide a mechanism for the establishment of rational priorities for environmental health.

ROLE OF THE WHO REGIONAL OFFICE FOR EUROPE

International cooperation and collaboration in environmental health is clearly needed. Not only WHO, but other members of the United Nations family including the Economic Commission for Europe, the United Nations Environment Programme, the International Labour Office and the Food and Agriculture Organization have important roles to play both individually and jointly. The same is true of a number of intergovernmental organizations such as the Organisation for Economic Co-operation and Development, the Council for Mutual Economic Assistance and the Commission of the European Communities. It is particularly important that European endeavours in environmental health should take place in a global context. Experience gained in industrialized countries should be shared with less developed countries and steps taken in developed countries should not have detrimental impacts in developing countries, whether in the European Region or elsewhere.

The Regional Office has an important role to play in data collection, evaluation and dissemination as well as in the training of personnel in environmental health, including toxicologists and middle-level personnel for inspection and control functions. The Regional Office also has an important role to play in stimulating increased efforts to solve specific environmental health problems. These endeavours should involve technical cooperation both nationally and internationally.

Sectors of government other than health ministries concerned with environmental health should establish contact with the Regional Office. This will be difficult to carry out through the existing policy organs, in

particular the Regional Committee, although it may be advisable in special instances to enlarge national delegations. A useful way for other sectors of government to increase contact with the Regional Office would be to establish a WHO European advisory group, which should be multisectoral and interdisciplinary. It should meet regularly to advise the Regional Office on all aspects of environmental health and on the programme development of the Office. Membership should be on a rotational basis and the structure of the existing WHO European Advisory Committee for Medical Research is an example of how the group should be established. It might be advantageous to hold meetings of the advisory group in different countries of the Region to provide the group with varying national experiences.

Although an advisory group should get top priority, a European conference on environmental health could also be useful, attended by senior government representatives from various branches of national administrations, to discuss national environmental health policies.

Finally, a WHO European multidisciplinary centre for environmental health could be established, but more detailed information should be collected by the Regional Office on what it should do, and how, and what other such centres are already doing elsewhere.

CONCLUSIONS AND RECOMMENDATIONS

Data

There are gaps in data on environmental health; for instance there is no linkage between morbidity/mortality data and environmental exposure. If already existing data were properly collated and disseminated, many of the existing shortcomings could be overcome, but a more comprehensive and well structured approach is needed both nationally and internationally. It is important that available expertise for this task should be identified and the efforts of these experts effectively harnessed.

The means to obtain more comprehensive environmental health data need to be developed and optimum use needs to be made of existing data by exploiting modern information technology.

Efforts should be made to ascertain where specific environmental health-related data are located. In some cases these data will need to be substantially augmented. A system should be established that allows the effective linkage of existing knowledge about people's health and biological effects, derived clinically, toxicologically or epidemiologically. All possible sources of health-related data, including the health services, other public services and industry, should be used effectively.

National environmental health policies

A multisectoral approach to environmental health is essential. Although government structures differ throughout the Region, appropriate coordination is essential everywhere to ensure that health is taken into consideration in all relevant sectors of government.

National environmental health policies should be developed. Primary prevention should be a priority and mechanisms for setting priorities in a systematic manner should be developed.

Risk assessment

The question of risk assessment is of utmost importance. The principles behind the recommendations in the report on the Planning Consultation in Ulm and the description of the risk assessment process and model are endorsed and should be further developed. The risk assessment process should take into account all routes of exposure, including water, air, food and the working environment, and should consider microbiological, physical, chemical and social risks. The potential impact on health of new technology — including biotechnology — and new products should be studied. Combined risks and indirect risks should be evaluated and the interdisciplinary nature of risk assessment should be recognized.

A holistic approach to risk assessment is required, taking into account economic, social and other factors with their beneficial as well as detrimental aspects.

The scientific basis for risk assessment should be strengthened.

Measures should be taken to ensure a more systematic identification of new environmental hazards and their potential health risks.

Research

Research in the biological sciences will have great significance in environmental health during the next few years. In addition to exposure from the general environment and the workplace, factors such as lifestyle, nutrition, stress and genetically derived individual sensitivity can all influence health.

The body's defence mechanism is essential to protect its health against insults from the environment. Some information indicates that this defence mechanism is greatly fortified by correct and adequate nutrition.

Research should be encouraged to identify the lifestyle, nutrition, stress and genetically determined defence mechanisms against toxic substances that contribute to ill health.

Efforts should be made to expand and coordinate clinical and epidemiological investigations to help identify environmental hazards and enhance prevention.

Collaboration between the medical and biological sciences in the field of the environment should be strengthened both nationally and internationally.

The use of industrial resources to support research should be carefully considered.

Education, training and communication

An interdisciplinary approach to environmental health is important. There is a lack of sufficiently trained personnel in many areas. The public needs better information about environmental health problems, including the role of lifestyle, and a better understanding of risk and risk prevention.

Environmental health, including occupational health, should be given more emphasis in medical training curricula.

Training in toxicology, epidemiology and appropriate biological sciences needs to be strengthened.

Specific training programmes in the methods of risk assessment should be established.

Public agencies should be encouraged to inform the public about comparative risks and the risks of individual hazards, without causing unnecessary alarm.

RISK ASSESSMENT AND ITS USE IN THE DECISION-MAKING PROCESS FOR CHEMICALS CONTROL

*Report on a Planning Consultation,
Ulm, 14-16 November 1983*

People are exposed to risks all the time. They may arise, for example, from physical acts (natural disasters, road traffic accidents, etc.), poisons (chemical and microbiological), or modern lifestyles (social relationships, economic decisions, etc.). Obviously, all risks cannot be eliminated from society, and we must learn to manage those risks that remain. Of particular contemporary concern is the management of risks caused by the manufacture, formulation, use and disposal of chemicals.

The manufacture and use of chemicals have increased dramatically during the last 25-30 years. There is therefore a greater chance that people will be exposed to chemicals, thus increasing the potential occurrence of adverse effects. A considerable cross-section of the public in many European countries has become convinced that the potential risks from chemicals in the environment are too great and are demanding more stringent controls. In devising such controls, one must ask "Can risk assessment be used as a tool for making rational decisions?"

The process of risk assessment encompasses both scientific activities (hazard identification and risk estimations) and socioeconomic evaluations (risk evaluation and management). It is the combination of these two endeavours that leads to the final political decision on risk management options.

As part of the WHO European regional programme on chemical safety, a Seminar on Evaluation and Risk Assessment of Chemicals was convened in Lodz, Poland, from 1 to 6 September 1980. The proceedings of this meeting^a summarize the state of the art, at that time, in toxicology and epidemiology related to the evaluation of risk from chemicals. Following this meeting, it was felt that advice was needed on the use of such risk assessment procedures for making rational decisions about chemicals control. In fact, risk assessment was one of the subjects given high priority in 1982 by the European Advisory Committee for Medical Research as well

^a *Health aspects of chemical safety*. Copenhagen, WHO Regional Office for Europe, 1982 (Interim Document No. 6).

as by a Planning Consultation on Health and the Environment convened by the Regional Office on 29 and 30 March 1983.

The present Planning Consultation on Risk Assessment and its Use in Decision-Making for Chemicals Control was therefore organized by the Regional Office in Ulm, from 14 to 16 November 1983, with the agreement of the Government of the Federal Republic of Germany and the support of the University of Ulm. The purpose of the Planning Consultation was to identify problems in the multidisciplinary process of risk assessment in chemicals control that require further study, and to make recommendations on how this should be done. The meeting was to advise the Regional Office on future programme development, including its institutional, financial and technical ramifications. Professor T. Fliedner was elected Chairman, Professor F. Pocchiari Vice-Chairman and Mr W. Lewis Rapporteur.

Discussion

Risk assessment is a tool for rational decision-making in chemicals control. Fig. 1 is a schematic diagram of the risk assessment process.

Risk assessment is a complex, multidisciplinary procedure. It is an iterative process for making rational decisions to manage the risks of exposure to chemicals. Risk assessment is a dynamic and continuous process. Contributions can be made at any point by one or more of the various people involved and may necessitate a re-evaluation of any decisions made before.

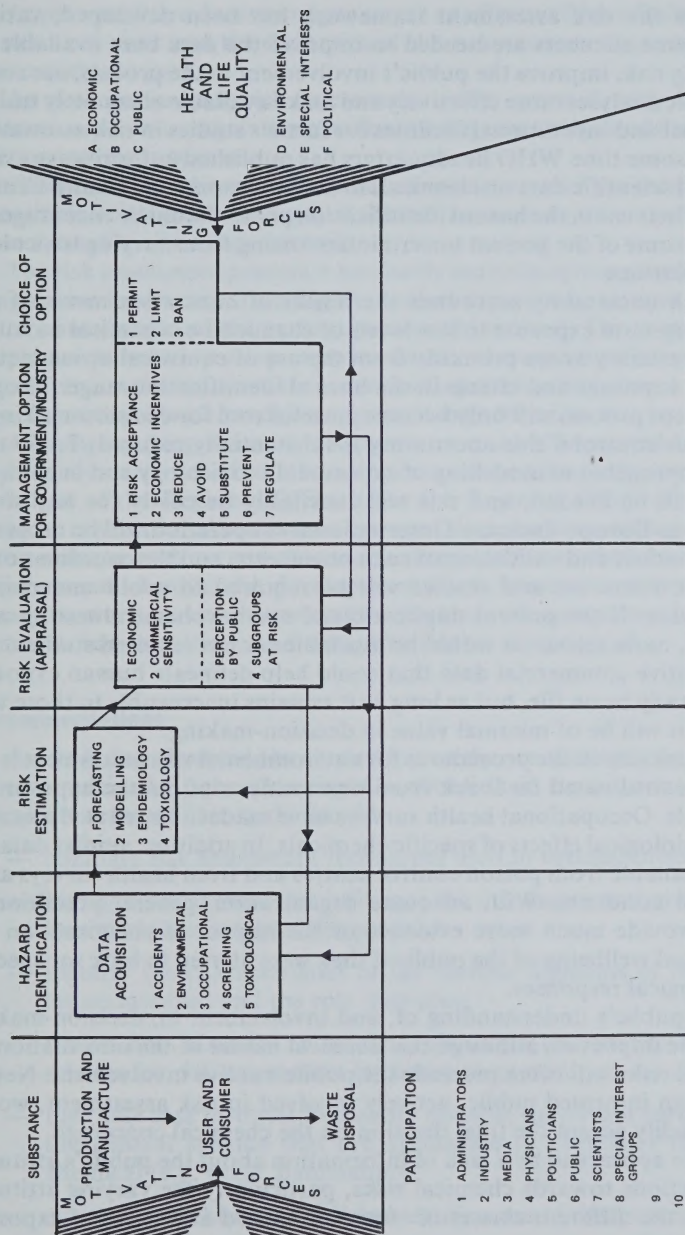
Throughout the whole process of risk assessment a variety of motivating forces exert an influence that may be critical at any of the various stages in the decision-making process.

Decisions about risk must be made at all stages of the lifecycle of a chemical. The risk assessment process presented can be used at any of these stages, but the extent of involvement of those participating in it may vary depending upon the stage in the lifecycle of the chemical under consideration.

Hazard identification, risk estimation, risk evaluation (appraisal) and management regulation adequately describe the steps in the overall process of risk assessment.

As shown in Fig. 1, the proposed flow chart for the risk assessment process is a skeleton that may prove useful in decision-making. Work is required to identify the people involved, the factors influencing the mechanics of the process and the weight assigned to each factor for various classes of chemical hazard. Comparison of this proposed scheme with present risk assessment procedures, as well as case histories, could be beneficial. Once refined by additional studies, particularly in the area of public perception, public participation and socioeconomic analysis, the process may prove to be a useful tool in decision-making.

Fig. 1. Risk assessment process



Once the risk assessment framework has been developed, various programme elements are needed to improve the data base available for assessing risk, improve the public's involvement in the process, use socio-economic analyses more effectively and make available adequately trained personnel and institutional facilities for further studies in risk assessment.

For some time WHO headquarters has published authoritative evaluations of scientific data on chemicals in the Environmental Health Criteria series. Their use in the hazard identification phase should be encouraged to remove some of the present uncertainties arising from varying toxicological evaluations.

Much uncertainty surrounds the results of most assessments of risk from long-term exposure to low levels of chemicals or chemical mixtures. The uncertainty arises primarily from the use of equivocal or inadequate data on exposure and effects in the hazard identification stage. The risk assessment process will only become a useful tool for decision-making in chemicals control if this uncertainty is substantially reduced. To do this, novel approaches in modelling of exposure, in toxicology and in epidemiology will be needed, and this will inevitably be costly for any single country in Europe. Increased international cooperation will be necessary in the conduct and validation of such novel tests, and the coordination of available resources and studies will be required to avoid unnecessary duplication. If the present duplication of routine chemical testing were reduced, more resources would be available for the required studies.

Sensitive commercial data that could help delineate human exposure may already be on file, but as long as it remains inaccessible to those who need it, it will be of minimal value in decision-making.

A weakness in the procedures for environmental risk assessment is the lack of coordinated feedback from observations of human exposure to chemicals. Occupational health surveys have made industry well aware of the physiological effects of specific chemicals. In addition, similar data are often available from poison control centres and from health surveys after chemical accidents. With adequate organization, general practitioners could provide much more evidence of the impact of chemicals on the health and wellbeing of the public if they were alerted to look for specific physiological responses.

The public's understanding of, and involvement in, decision-making should be improved, although the technical nature of the information on chemical risks will often preclude the public's active involvement. Nevertheless, an informed public, actively involved in risk assessment, would more readily accept the final decision on the chemical concerned.

There appears to be a lack of information about the public's attitudes and reactions towards chemical risks, particularly the varying attitudes towards the different classes of chemical hazard and types of exposure encountered.

At present, there does not appear to be an effective flow of information on chemical risks and the dynamics of the risk assessment process to all who could take part.

As now performed, risk assessments often move directly from the evaluation phase to regulations, without adequate analysis of the various risk management options.

Cost-benefit and cost-effectiveness analyses are not yet incorporated formally into the relevant stages of the risk assessment process, especially those related to chemicals control.

The risk assessment process is inevitably multidisciplinary and requires imaginative leadership from highly trained experts to optimize the specialist contribution of the various personnel involved. The postgraduate training required to develop expertise in risk assessment will depend to a large extent on the nature of the individual's primary discipline, e.g. medicine, chemistry, law; a modular approach may therefore be appropriate.

A European programme on risk assessment could be carried out in two ways: (a) by a network of collaborating centres coordinated by one of them on behalf of the Regional Office or by the Regional Office directly, or (b) by an international institute or agency. Given the scope and complexity of the work to be done and the need to integrate it into the broad field of environmental health, the development of an international institute or agency to work on environmental health and risk assessment related to chemicals has attractions and should be further investigated.

Recommendations

1. A detailed study should be carried out on the use of the risk assessment process outlined by the Planning Consultation in decision-making for chemicals control. This study should:

- compare risk assessment techniques used in various countries;
- highlight the factors that influence the risk assessment process and how these are weighted for particular cases;
- identify the characteristics of the various segments of the population involved and the role they play;
- review case histories to confirm, elaborate and lead to a refined scheme for risk assessment in chemicals control;
- use these case histories to identify possible significant variations in the general scheme that are applicable to particular classes of chemical (e.g. toxic, flammable);
- use these case histories to help identify areas of dysfunction within the risk assessment process.

2. Given the contribution the Environmental Health Criteria series can make to risk assessment, the International Programme on Chemical Safety should further improve and extend the production of such publications on chemicals of concern to society.

3. The public should be informed about risk assessment and encouraged to taken an informed active part in the process. The Regional Office should encourage studies on how to facilitate the more active participation of an informed public in decision-making by:

- ascertaining the nature of public concern about chemicals, with particular emphasis on areas where public perception of the risk is markedly out of step with available data;
- categorizing and appraising the different strategies used to communicate with the public;
- exploring the effectiveness of different ways of communicating with the public;
- providing guidance on how to develop and evaluate programmes of public information and education about the dynamics of risk assessment and risk perception;
- providing the public, in an effective manner, with information about risks from chemicals, written in non-scientific language and making extensive use of scenarios and illustrative examples of the likelihood and consequences of exposure to chemicals.

4. Given the need to strengthen the consideration of economic aspects, WHO should investigate how to adapt cost-benefit, cost-effectiveness and other economic appraisal techniques to the requirements of risk assessment by:

- reviewing the activities of the World Bank, the Organisation for Economic Co-operation and Development and the Council for Mutual Economic Assistance;
- building into the appraisal a consideration of the distribution of costs, effects and benefits;
- taking account of uncertainty, risk probabilities and public perception;
- making the appraisal techniques also useful to the early stages of the risk assessment process;
- structuring the appraisal so as to permit continuous feedback by the participants in the risk assessment process.

5. A comparative study should be carried out on the effectiveness of government regulation versus promotion of self-regulation by industry, to provide guidance on the consequences for risk management. With particular emphasis on possible trade-offs between risk prevention and control, the research should include investigation of different product liability systems and related economic incentives.

6. The International Programme on Chemical Safety should play a leading role in the coordination of current and planned testing of chemicals by ensuring that information is collected and made available on testing facilities and on the current and planned tests in each facility; and that governments are given guidance on how to harmonize the testing of chemicals (e.g. using standardized guidelines) more adequately and assistance on the development of better models to define long-term, low-level human exposure to chemicals and its consequences for health in terms of functional disturbances (ranging from death to a decrement in health and wellbeing).

7. Data on people's physiological responses to exposure to chemicals are often available from occupational health surveys, poison control centres or investigations of chemical accidents. The Regional Office should give guidance on the development of an effective mechanism for advising general practitioners, on the basis of such data, of the appropriate symptoms to look for in the general population in specific areas.

8. The Regional Office should identify the type of people engaged in the risk assessment of chemicals and analyse the lack of knowledge that hinders their active leadership. A study group should be convened to identify the education and training opportunities needed to attract people interested in developing these technical skills and to make further recommendations about manpower training for those involved in risk assessment.

9. The Regional Office should survey the institutions engaged in environmental health research, particularly research on risk assessment. Guidance should be obtained on the value and feasibility of establishing a European institute on risk assessment for chemicals as an international centre for environmental health.

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RESUME

Introduction

Le groupe de travail sur la santé et l'environnement a été convoqué sur recommandation d'une consultation sur la santé et l'environnement, organisée à Copenhague en mars 1983, par le Bureau régional de l'OMS pour l'Europe. Il a permis de réunir vingt-quatre conseillers temporaires originaires de dix-huit Etats Membres, ainsi que quatre représentants d'autres organisations internationales. La réunion a été rendue possible par l'appui puissant du Ministère fédéral autrichien de la santé et de la protection de l'environnement.

Le groupe de travail avait pour mandat de dresser un état de la salubrité de l'environnement dans la Région et de dégager les tendances probables pour l'avenir. Il lui a été demandé d'identifier les faiblesses actuelles dans le secteur de la recherche, de la surveillance continue, de l'évaluation du risque et du contrôle, compte tenu de la nécessité d'une approche multi-sectorielle coordonnée. Le groupe devait enfin formuler des recommandations destinées aux Etats Membres et guider l'élaboration de programmes du Bureau régional.

Discussion

La discussion a été axée autour de quatre thèmes principaux : la santé en Europe dans le contexte de l'environnement; l'évaluation des risques et ses composantes «recherche», et les problèmes pertinents; la question de la structure des services de salubrité de l'environnement dans les pays européens et le rôle du Bureau régional de l'OMS pour l'Europe.

Au cours de la discussion du premier point, l'accent a été mis sur les différences constatées en matière de santé dans les différents pays. Les disparités reconnues quant au taux de mortalité infantile, à l'espérance de vie et à la mortalité par âge sont particulièrement imputables aux conditions écologiques. Outre les effets d'un approvisionnement en eau et d'un assainissement insuffisants, qui se font particulièrement sentir dans les pays moins développés de la Région, de nouvelles atteintes chimiques,

physiques et biologiques risquent de plus en plus de devenir significatives. Les essais visant à contenir certains des facteurs responsables de la pollution du milieu ont donné lieu à certains progrès; d'autres cependant s'aggravent encore et il faut s'efforcer, tant sur le plan national qu'international, de réaliser une action continue. Parmi les facteurs écologiques importants ayant une influence sur la santé, il convient de mentionner en particulier les émissions des moteurs à combustion interne ainsi que de nombreux types d'accidents. L'exemple de la pollution transfrontière de l'air et de l'eau peut être mis en évidence comme typique de situations appelant la concertation internationale.

Au cours de la discussion qui a porté sur l'évaluation du risque, on a analysé les conclusions des recherches biologiques les plus récentes. Selon certaines indications, les progrès de la connaissance pourront, dans un avenir relativement proche, amener une meilleure compréhension des problèmes de salubrité de l'environnement, d'où la possibilité d'établir de nouvelles voies de prévention. Le rapport de la consultation de planification sur l'évaluation des risques et ses utilisations dans le processus de la prise de décisions en matière de lutte contre les substances chimiques, tenue à Ulm en novembre 1983, a également été examiné, et il est apparu que les démarches adoptées par la consultation, bien que visant spécifiquement les problèmes inhérents aux substances chimiques, sont d'une application plus générale. On a fait ressortir, au cours des débats, que la perception du risque dans la population générale varie selon l'individu, selon la situation socio-économique et les antécédents culturels. L'importance du rôle des médias dans l'information du public, ainsi que les interactions entre les grands moyens d'information, d'une part, et les professions libérales et l'administration, de l'autre, a également été évoquée.

Au cours de la discussion sur les services de salubrité de l'environnement, on a affirmé que la complexité de la société contemporaine tend à entraîner des structures administratives complexes. Des problèmes de communication peuvent s'ensuivre; on peut cependant y remédier en améliorant la coopération et en coordonnant. Les participants ont jugé que le Bureau régional a un rôle important à jouer dans la promotion des politiques de salubrité de l'environnement, tant sur le plan national que régional.

Conclusions et recommandations

Données

Les données fondamentales sur la salubrité de l'environnement présentent des lacunes. On citera notamment le fait que les données de morbidité/mortalité n'ont fait l'objet d'aucun couplage avec les renseignements sur l'exposition environnementale. Si les données dont on dispose

déjà étaient convenablement recueillies et diffusées, on pourrait pallier nombre de faiblesses actuelles; il importe cependant d'adopter une approche plus globale, bien structurée, tant sur le plan des pays qu'au niveau international. Il importe de dresser l'inventaire des compétences dont on dispose à cette fin et de tirer systématiquement parti des efforts de ces experts.

Il importe de développer les moyens d'obtenir des données plus exhaustives sur la salubrité de l'environnement et d'utiliser de façon optimale les données existantes en exploitant les techniques modernes de l'information.

Il faudrait s'efforcer de localiser les données environnementales spécifiquement liées à la santé. Dans certains cas, ces données devront être sensiblement augmentées.

Il importe de mettre en place un système permettant un couplage rationnel des connaissances existantes sur la santé humaine et les effets biologiques, qu'elles soient d'origine clinique, toxicologique ou épidémiologique.

Les informations provenant de toutes les sources possibles de renseignements sur la santé — y compris les services de santé et autres services publics, ainsi que l'industrie — devraient être exploitées rationnellement.

Politiques nationales de salubrité de l'environnement

Il importe essentiellement d'adopter une approche multisectorielle à la salubrité de l'environnement sur le plan national. Les structures gouvernementales varient dans la Région; il est cependant essentiel de procéder à la coordination voulue pour garantir qu'il est dûment tenu compte, dans tous les secteurs pertinents du gouvernement, des considérations relatives à la santé.

Il faudrait élaborer des politiques nationales de salubrité de l'environnement. La dimension préventive primaire a été mise en évidence, de même que la nécessité d'élaborer des structures pour des priorités systématiques.

Il faudrait renforcer la coordination dans tous les services publics susceptibles d'avoir un impact sur la salubrité de l'environnement.

Evaluation du risque

La question de l'évaluation du risque revêt une importance capitale. Les participants ont repris à leur compte les principes sous-jacents aux recommandations et la description du processus et du modèle d'évaluation de risques, tels que contenus dans le rapport sur la consultation de planification d'Ulm. Le processus d'évaluation des risques devrait tenir compte de toutes les voies d'exposition, y compris l'eau, l'air, l'alimentation et

les milieux de travail et envisager les risques microbiologiques, physiques, chimiques et sociologiques. Il faudrait s'attacher à étudier l'impact potentiel sur la santé des technologies nouvelles, y compris la biotechnologie et les produits récents. L'importance de l'évaluation des risques combinés et indirects a été soulignée et la nature interdisciplinaire de l'évaluation du risque, reconnue.

Il faut adopter en matière d'évaluation du risque une approche holistique, tenant compte de facteurs économiques, sociaux et autres, avec leurs aspects positifs et négatifs.

Il faudrait renforcer la base scientifique de l'évaluation du risque.

Des mesures devraient être adoptées en vue d'une identification plus systématique du risque potentiel pour la santé, du fait de nouveaux dangers écologiques.

Recherche

Les travaux en cours dans le domaine des sciences biologiques auront sur la salubrité de l'environnement un impact fondamental. Outre l'exposition du fait de l'environnement général et de lieux de travail, des facteurs tels que les modes de vie, la nutrition, le logement, le stress et la sensibilité individuelle d'origine génétique, peuvent avoir des répercussions sur la salubrité de l'environnement.

Un facteur essentiel, en matière de protection de la santé contre les assauts de l'environnement, est constitué par les mécanismes de défense corporels. Selon certaines informations, ces mécanismes de défense sont sensiblement fortifiés par une alimentation correcte et suffisante.

Il conviendrait d'encourager les recherches visant à identifier les facteurs liés au mode de vie, à la nutrition, au logement, au stress et aux mécanismes de défense d'origine génétique contre les substances toxiques contribuant à l'insalubrité de l'environnement.

Il faudrait s'efforcer d'élargir et de coordonner les recherches cliniques et épidémiologiques pour aider à déterminer les risques écologiques, en vue d'améliorer la prévention.

La collaboration entre les sciences médicales et biologiques, dans le domaine de l'environnement, devrait être renforcée tant sur le plan national qu'à l'échelle internationale.

Le recours à des ressources industrielles pour favoriser la recherche devrait être mûrement envisagé.

Education, formation et communication

Il importe d'adopter en matière de salubrité de l'environnement une approche interdisciplinaire. Les effectifs qualifiés font défaut dans de nombreux secteurs. Le public doit être mieux informé des questions de

salubrité de l'environnement, y compris le rôle des facteurs tels que le mode de vie, le logement, le stress, etc., notamment quant à la perception du risque et à la prévention du risque.

Il faudrait accorder, dans les programmes de formation médicale, une plus large place à la salubrité de l'environnement.

Il faut renforcer la formation en toxicologie, en épidémiologie et dans les sciences biologiques appropriées.

Des programmes de formation devraient être établis concernant les méthodes d'évaluation du risque.

Les services publics devraient encourager l'information de la population sur les questions d'évaluation du risque. On s'efforcera de sensibiliser le public tout en le renseignant sans provoquer de préoccupations inutiles.

Coopération et collaboration internationales

Le Bureau régional de l'OMS pour l'Europe est appelé à jouer un rôle fondamental en matière de salubrité de l'environnement dans la Région européenne. Il en est notamment ainsi pour les questions de collecte, d'évaluation et de diffusion de données.

Un groupe consultatif européen de l'OMS, de nature multisectorielle et interdisciplinaire, devrait être créé et se réunir régulièrement pour conseiller le Bureau régional sur toutes les questions de salubrité de l'environnement. Le groupe consultatif pourrait utilement se réunir, par roulement, dans différents pays de la Région.

Un certain intérêt a été manifesté pour la création d'un centre interdisciplinaire européen de l'OMS de salubrité de l'environnement. Pour qu'une suite puisse être donnée à cette suggestion, le Bureau régional devrait toutefois recueillir des informations plus détaillées sur les principales tâches qu'il est prévu d'accomplir et sur les mécanismes administratifs; un inventaire des efforts connexes actuellement en cours dans la Région européenne devrait aussi être dressé.

L'importance croissante de la salubrité de l'environnement justifie l'attribution, par le Bureau régional, de ressources financières et d'effectifs accrus à ce secteur du programme.

Le Bureau régional de l'OMS pour l'Europe a un rôle important à jouer dès lors qu'ils s'agit de stimuler, tant sur le plan national que dans les organisations internationales, des efforts accrus en vue de résoudre les problèmes liés à la salubrité de l'environnement.

Toutes les activités relatives à la sécurité des substances chimiques, effectuées par le Bureau régional de l'OMS pour l'Europe, devraient être mises en œuvre en étroite coordination avec le programme international sur la sécurité des substances chimiques, et s'il y a lieu en son sein, et ce, afin de favoriser au maximum les efforts mondiaux dans le domaine de la salubrité de l'environnement.

ZUSAMMENFASSUNG

Einleitung

Die Arbeitsgruppe wurde auf Empfehlung einer vom WGO-Regionalbüro für Europa im März 1983 in Kopenhagen abgehaltenen Beratungstagung über Gesundheit und Umwelt eingesetzt. An der Tagung der Arbeitsgruppe nahmen 24 Berater auf Zeit aus 18 Mitgliedstaaten sowie 4 Vertreter anderer internationaler Organisationen teil. Die Tagung wurde mit intensiver Unterstützung des österreichischen Bundesministeriums für Gesundheit und Umweltschutz einberufen.

Die Arbeitsgruppe erhielt das Mandat, den gegenwärtigen Stand des gesundheitsbezogenen Umweltschutzes in der Region sowie zu erwartende künftige Tendenzen zu untersuchen. Sie hatte die Aufgabe, Mängel innerhalb bestehender Forschungs-, Überwachungs-, Risikobewertungs- und Kontrollstrategien aufzudecken, dabei jedoch zu berücksichtigen, daß diese Aufgabe einen sektorübergreifenden und koordinierten Ansatz erfordert. Schließlich hatte sie die Aufgabe, Empfehlungen für die Mitgliedstaaten zu formulieren und Richtlinien für die Entwicklung des entsprechenden Programms des Regionalbüros aufzustellen.

Diskussion

Die Diskussion konzentrierte sich auf vier Hauptthemenbereiche: den gegenwärtigen Gesundheitszustand in Europa im Verhältnis zur Umweltqualität; den Problembereich der Risikobewertung und der damit zusammenhängenden Forschungskomponenten; die Frage des administrativen Rahmens, in den der gesundheitsbezogene Umweltschutz in den europäischen Ländern eingepaßt ist; und schließlich die Rolle des WGO-Regionalbüros für Europa in diesem Bereich.

In der Diskussion über den gegenwärtigen Gesundheitszustand in Europa wurde das Hauptgewicht auf die verschiedenen gesundheitlichen Voraussetzungen gelegt, die in den einzelnen Ländern gegeben sind. Die

festgestellten Unterschiede im Hinblick auf Säuglingssterblichkeit, Lebenserwartung und altersspezifische Mortalität sind in hohem Maße auf Umweltbedingungen zurückzuführen. Zusätzlich zu den Auswirkungen unzureichender Wasserversorgung und schlechter hygienischer Bedingungen, die sich hauptsächlich in den weniger entwickelten Ländern der Region bemerkbar machen, werden neue chemikalische, physikalische und biologische Belastungen sehr wahrscheinlich an Bedeutung gewinnen. In einiger Hinsicht konnte die Umweltverschmutzung durch bestimmte Quellen bereits eingedämmt werden, in anderen Bereichen nimmt sie jedoch weiter zu, und es ist dringend erforderlich, sowohl auf nationaler als auch auf internationaler Ebene fortlaufend Bemühungen zur Durchsetzung konkreter Maßnahmen zu unternehmen. Wichtige Umweltfaktoren, die sich auf die Gesundheit auswirken, sind vor allem Emissionen aus Verbrennungsmotoren sowie verschiedene Arten von Störfällen. Als Beispiel für Probleme, die dringend internationale Maßnahmen erfordern, wurde besonders die grenzüberschreitende Verschmutzung von Luft und Wasser hervorgehoben.

In der Diskussion über Fragen der Risikobewertung wurde eine Übersicht über neue biologische Forschungsergebnisse gegeben. Es gibt Anzeichen dafür, daß neue Erkenntnisse schon in naher Zukunft zu einem besseren Verständnis der Probleme im Zusammenhang mit dem gesundheitsbezogenen Umweltschutz führen und die Entwicklung neuer Präventionsmöglichkeiten ermöglichen werden. Auch der Bericht über die „Planning Consultation on Risk Assessment and its Use in the Decision-Making Process for Chemicals Control“ (Planungstagung über Risikobewertung und deren Bedeutung im Entscheidungsfindungsprozeß im Hinblick auf die Chemikalienkontrolle), die im November 1983 in Ulm abgehalten wurde, wurde erörtert. Der Ausschuß war der Ansicht, daß die auf der Planungstagung erarbeiteten Konzepte, obwohl diese speziell auf Probleme im Zusammenhang mit Chemikalien zugeschnitten sind, auf einer allgemeineren Grundlage angewendet werden könnten. Es wurde hervorgehoben, daß das Risikoempfinden in der Bevölkerung sowohl individuell als auch in den verschiedenen sozioökonomischen Gruppen mit unterschiedlichem kulturellem Hintergrund sehr stark differiert. Auch die Bedeutung der Rolle der Medien im Hinblick auf Aufklärung und Information der Öffentlichkeit, sowie die Interaktion zwischen den Medien einerseits und Vertretern der entsprechenden Berufsgruppen und zuständigen Behörden andererseits, wurden erörtert.

Hinsichtlich der Strukturierung und Verwaltung des gesundheitsbezogenen Umweltschutzes wurde unterstrichen, daß unsere heutige komplexe Gesellschaft dazu tendiert, auch komplexe administrative Strukturen hervorzubringen, was wiederum zu Kommunikationsproblemen führen kann, die sich jedoch durch bessere Zusammenarbeit und entsprechende Koordinierung ausräumen ließen. Dem WGO-Regionalbüro für Europa kommt im Hinblick auf die Förderung von Konzepten und Strategien des

gesundheitsbezogenen Umweltschutzes sowohl national als auch regional eine wichtige Rolle zu.

Schlußfolgerungen und Empfehlungen

Daten

Das grundlegende Datenmaterial über den gesundheitsbezogenen Umweltschutz weist immer noch große Lücken auf. Es gibt u.a. keine Verbindung zwischen Morbiditäts-/Mortalitätsdaten und Daten über die Exposition gegenüber Umweltfaktoren. Wenn das bereits vorhandene Datenmaterial entsprechend zusammengetragen und verbreitet würde, könnten viele der bestehenden Mängel weggeräumt werden, was jedoch auf nationaler wie auch internationaler Ebene eine umfassendere und gut strukturierte Vorgehensweise voraussetzt. Es ist von großer Bedeutung, daß die Fachkräfte, die diese Aufgabe erfüllen könnten, ermittelt und ihre Bemühungen und Kenntnisse effektiv eingesetzt werden.

Es müssen Möglichkeiten gefunden werden, umfassendere Daten über den gesundheitsbezogenen Umweltschutz zusammenzustellen und das vorhandene Datenmaterial durch Ausnutzung der modernen Informationstechnologie optimal zu nutzen.

Es sollten Bemühungen unternommen werden, um festzustellen, in welchen Bereichen Daten mit Bezug zum gesundheitsbezogenen Umweltschutz vorhanden sind. In einigen Fällen wird es erforderlich sein, dieses Datenmaterial erheblich auszuweiten.

Es sollte ein System entwickelt werden, welches die Möglichkeit bietet, die im klinischen, toxikologischen und epidemiologischen Bereich gewonnenen Erkenntnisse über menschliche Gesundheit und biologische Wirkungsweisen effektiv miteinander zu verknüpfen.

Informationen aus den unterschiedlichsten Quellen, die gesundheitsbezogene Daten zur Verfügung stellen können, einschließlich der Gesundheitsdienste und sonstiger öffentlicher Dienste sowie der Industrie, sollten effektiv genutzt werden.

Nationale Konzepte für den gesundheitsbezogenen Umweltschutz

Für die Ausarbeitung eines nationalen Konzepts für den gesundheitsbezogenen Umweltschutz ist ein ressortübergreifender Ansatz unbedingt erforderlich. Obwohl sich die Regierungsstrukturen in den einzelnen Ländern der Region voneinander unterscheiden, ist eine angemessene Koordinierung dringend erforderlich, um zu gewährleisten, daß in allen relevanten Regierungsressorts Gesundheitsaspekte mit in die entsprechenden Überlegungen einbezogen werden.

Nationale grundsatzpolitische Konzepte für den gesundheitsbezogenen Umweltschutz sollten ausgearbeitet werden. Besonders hervorgehoben

wurde der Aspekt der Primärprävention und auch die Notwendigkeit, Mechanismen zur systematischen Festsetzung von Prioritäten zu entwickeln.

Die Koordinierung zwischen allen Regierungsressorts, deren Entscheidungen sich auf den gesundheitsbezogenen Umweltschutz auswirken könnten, sollte verstärkt werden.

Risikobewertung

Die Frage der Risikobewertung ist von größter Bedeutung. Die Arbeitsgruppe unterstützt grundsätzlich die Empfehlungen sowie auch die Darstellung des Risikobewertungsprozesses und -modells, so wie im Bericht über die Planungstagung in Ulm ausgeführt. Im Risikobewertungsprozeß sollten alle Expositionswege, einschließlich Wasser, Luft, Nahrungsmitteln und Arbeitsumgebung, Berücksichtigung finden, und sowohl mikrobiologische als auch physikalische, chemische und soziologische Risiken untersucht werden. Die Untersuchung der potentiellen Auswirkungen neuer Technologien – einschließlich der Biotechnologie – und neuer Produkte auf die Gesundheit darf in diesem Zusammenhang nicht vergessen werden. Die Arbeitsgruppe unterstrich die Bedeutung der Bewertung kombinierter Risiken und indirekter Risiken und wies auf den interdisziplinären Charakter des Risikobewertungsprozesses hin.

Der Prozeß der Risikobewertung erfordert eine ganzheitliche Betrachtungsweise, bei der wirtschaftliche, soziale und andere Faktoren berücksichtigt werden, und zwar jeweils sowohl die positiven als auch die negativen Aspekte der einzelnen Faktoren.

Die wissenschaftliche Grundlage für die Risikobewertung sollte verstärkt werden.

Es sollten Maßnahmen ergriffen werden, um potentielle Gesundheitsrisiken, die durch neue schädliche Umweltfaktoren verursacht werden, systematischer zu ermitteln.

Forschung

Die gegenwärtig im Bereich der biologischen Wissenschaften durchgeführten Forschungsarbeiten werden für den gesundheitsbezogenen Umweltschutz von grundlegender Bedeutung sein. Zusätzlich zu der Exposition gegenüber allgemeinen Umweltbelastungen und der Exposition am Arbeitsplatz können sich Faktoren wie etwa Lebensweise, Ernährung, Wohnbedingungen, Streß und genetisch bedingte, individuelle Anfälligkeit im Bereich des gesundheitsbezogenen Umweltschutzes auswirken.

Ein wesentlicher Faktor im Hinblick auf den Schutz der Gesundheit vor schädlichen Umwelteinflüssen ist der körpereigene Abwehrmechanismus. Das über dieses Thema vorhandene Informationsmaterial erhärtet die Vermutung, daß dieser Abwehrmechanismus durch richtige und ausgewogene Ernährung erheblich gestärkt wird.

Forschungsaktivitäten zur Ermittlung der Faktoren im Zusammenhang mit Lebensweise, Ernährung, Wohnbedingungen, Streß und genetisch bedingten Abwehrmechanismen gegen toxische Substanzen, die zu umweltbedingten Gesundheitsschäden beitragen, sollten gefördert werden.

Bemühungen sollten unternommen werden, um klinische und epidemiologische Untersuchungen auszuweiten und zu koordinieren, so daß schädliche Umwelteinflüsse, im Hinblick auf eine verbesserte Prävention, identifiziert werden können.

Die Zusammenarbeit zwischen den medizinischen und den biologischen Wissenschaften im Umweltbereich sollte sowohl auf nationaler als auch auf internationaler Ebene verstärkt werden.

Die Nutzung industrieller Ressourcen zur Unterstützung der Forschungstätigkeit sollte unter sorgfältiger Berücksichtigung aller Vor- und Nachteile in Betracht gezogen werden.

Erziehung, Ausbildung und Kommunikation

Es ist wichtig, dem gesundheitsbezogenen Umweltschutz eine interdisziplinäre Betrachtungsweise zugrunde zu legen. In vielen Bereichen mangelt es an entsprechend ausgebildetem Personal. Der Öffentlichkeit muß bessere Information über Fragen im Zusammenhang mit dem gesundheitlichen Umweltschutz, einschließlich der Rolle solcher Faktoren wie Lebensweise, Wohnbedingungen, Streß, etc. zur Verfügung gestellt werden, insbesondere im Hinblick auf das Risikoempfinden der Bevölkerung und Möglichkeiten der Risikoprävention.

In den medizinischen Ausbildungsplänen sollte größerer Nachdruck auf den gesundheitsbezogenen Umweltschutz gelegt werden.

Die Ausbildung in Toxikologie, Epidemiologie und geeigneten biologischen Wissenschaften muß intensiviert werden.

Es sollten besondere Ausbildungsprogramme über die Methodologie der Risikobewertung aufgestellt werden.

Die Weitergabe von Information über Risikobewertung durch öffentliche Behörden an die Bevölkerung sollte gefördert werden, um eine bewußte und informierte Öffentlichkeit zu schaffen, ohne dabei unnötige Besorgnis hervorzurufen.

Internationale Zusammenarbeit

Dem WGO-Regionalbüro für Europa kommt im Hinblick auf den gesundheitsbezogenen Umweltschutz in der Europäischen Region eine wichtige Funktion zu, insbesondere was die Zusammentragung, Evaluierung und Verbreitung entsprechender Daten betrifft.

Eine Beratergruppe des WGO-Regionalbüros für Europa mit ressortübergreifendem und interdisziplinärem Charakter sollte eingerichtet werden

und regelmäßig zusammenkommen, um das Regionalbüro über sämtliche Aspekte des gesundheitsbezogenen Umweltschutzes zu unterrichten und zu beraten. Es könnte vorteilhaft sein, wenn die Beratergruppe ihre Tagungen turnusmäßig in verschiedenen Ländern der Region abhält.

Das Konzept, ein interdisziplinäres europäisches Zentrum für gesundheitsbezogenen Umweltschutz der WGO einzurichten, wurde mit Interesse aufgenommen. Zur eingehenderen Untersuchung dieses Vorschlags sollte jedoch vom Regionalbüro noch genauere Information über die wichtigsten Aufgaben, mit denen ein solches Zentrum betraut würde, sowie über geeignete administrative Strukturen zusammengetragen und ein Verzeichnis vergleichbarer, gegenwärtig in der Europäischen Region unternommener, Bemühungen erstellt werden.

Die wachsende Bedeutung des gesundheitsbezogenen Umweltschutzes rechtfertigt die Veranschlagung zusätzlicher finanzieller und personeller Ressourcen für diesen Programmbereich am Regionalbüro.

Dem Regionalbüro für Europa kommt in diesem Bereich eine wichtige Funktion zu; es kann sowohl auf landesweiter Ebene als auch innerhalb internationaler Organisationen Anreize dafür geben, daß verstärkte Bemühungen zur Lösung der Probleme im Zusammenhang mit dem gesundheitsbezogenen Umweltschutz unternommen werden.

Sämtliche Aktivitäten des WGO-Regionalbüros für Europa mit Bezug zur Chemikaliensicherheit sollten in Koordination mit und gegebenenfalls als Teil des Internationalen Programms für Chemikaliensicherheit durchgeführt werden, um die im Bereich des gesundheitsbezogenen Umweltschutzes weltweit unternommenen Bemühungen so gut wie möglich zu unterstützen.

РЕЗЮМЕ

Введение

Совешание данной Рабочей группы было организовано во исполнение рекомендаций Консультативного совещания по влиянию окружающей среды на здоровье, которое было проведено Европейским региональным бюро ВОЗ в Копенгагене в марте 1983 года. В нем приняли участие 24 временных советника из 18 государств-членов, а также 4 представителя других международных организаций. Федеральное министерство здравоохранения и охраны окружающей среды Австрии оказало значительную помощь в организации совещания.

Перед Рабочей группой стояла задача проанализировать настоящее положение дел в области охраны окружающей среды в странах Региона и определить возможные тенденции его изменения. Участники совещания должны были также определить недостатки проводимых в настоящее время стратегий научных исследований, мониторинга, оценки факторов риска и борьбы с ними, принимая при этом во внимание необходимость разработки многосекторального и скоординированного подхода. И, наконец, перед совещанием стояла задача выработать рекомендации для государств-членов и определить направления развития программы Регионального бюро.

Дискуссия

В ходе дискуссии были обсуждены четыре основные темы: влияние внешней среды на состояние здоровья населения стран Европы; проблемная область оценки факторов риска и связанные с ней научно-исследовательские компоненты; организационные вопросы охраны окружающей среды в европейских странах; роль Европейского регионального бюро ВОЗ.

При обсуждении состояния здоровья населения стран Европы основное внимание уделялось неодинаковому положению в этой области в различных странах. Установлено, что различия

в детской смертности, продолжительности жизни и смертности от возрастных болезней в первую очередь определяются условиями окружающей среды. Кроме отрицательного воздействия неадекватных условий водоснабжения и санитарии, которое особенно ощущается в менее развитых странах Региона, все большую значимость приобретают новые химические, физические и биологические стрессы. Достигнуты определенные успехи в борьбе с некоторыми факторами, которые вызывают загрязнение окружающей среды, однако другие факторы такого рода приобрели еще более серьезный характер, отсюда – необходимость принятия национальных и международных мер по развитию непрерывной деятельности в этой области. Говоря о наиболее важных средовых факторах, оказывающих влияние на здоровье, в первую очередь следует упомянуть загрязнение воздуха автомобильным транспортом, а также несчастные случаи самых различных видов. В качестве одной из конкретных областей, требующих международных действий, была упомянута проблема трансграничного загрязнения воздушного бассейна и водоисточников.

В ходе обсуждения факторов риска были рассмотрены последние результаты научных исследований по биологии. Есть предположение, что в сравнительно недалеком будущем развитие знаний поможет лучше понять проблемы загрязнения окружающей среды и определить новые пути их предупреждения. Был также проанализирован отчет Консультативного совещания по планированию мер оценки факторов риска и их использованию в процессе принятия решений в области обеспечения безопасности химических веществ, которое состоялось в Ульме в ноябре 1983 года. Разработанные совещанием подходы, хотя они и связаны со специфическими проблемами химической безопасности, можно использовать и в других областях. Участники дискуссии подчеркнули, что население воспринимает факторы риска по-разному, в зависимости от индивидуальных особенностей, а также социально-экономических условий и уровня культуры. Обсуждались также важная роль средств массовой информации в информировании населения и взаимоотношения представителей этих средств с медработниками и административными органами.

В ходе обсуждения вопросов управления охраной окружающей среды отмечалась тенденция развития сложных административных структур в сложных условиях современного общества. Это может вызвать проблемы коммуникационного характера, которые, однако, могут быть устранены в результате углубления

сотрудничества и улучшения координации. Рабочая группа считает, что Региональное бюро призвано сыграть важную роль в развитии политики в области охраны окружающей среды на национальном и региональном уровнях.

Выводы и рекомендации

Данные

Есть определенные пробелы в основных данных о санитарном состоянии окружающей среды. В частности, речь идет об отсутствии информации, позволяющей определить воздействие окружающей среды на заболеваемость/смертность. Если бы имеющиеся данные были бы соответствующим образом собраны и распространены, многие из имеющихся недостатков можно было бы преодолеть. Однако при этом следует учитывать необходимость разработки более всестороннего и лучше организованного подхода на национальном и международном уровнях. Важно определить, какие специалисты могут помочь в выполнении этой задачи, и обязательно заручиться их поддержкой.

Необходимо создать средства для получения более всесторонней информации о санитарном состоянии окружающей среды и оптимально использовать существующие данные, прибегая для этого к помощи современной информационной технологии.

Следует предпринять усилия для определения местонахождения конкретных данных о санитарном состоянии окружающей среды. В отдельных случаях эти данные потребуются значительно расширить.

Следует создать систему, с помощью которой можно было бы проводить эффективное сравнение данных о состоянии здоровья с данными о биологическом воздействии, получаемыми с помощью клинических, токсикологических или эпидемиологических методов.

Необходимо добиться эффективного использования медико-санитарной информации, получаемой из всех возможных источников, включая службы здравоохранения и другие общественные службы, а также промышленность.

Национальная политика в области охраны окружающей среды

Необходимо использовать многосекторальный подход при организации национальных мероприятий в области охраны окружающей среды. Хотя правительственные структуры неодинаковы в различных странах Региона, крайне важно добиться соответствующей координации деятельности, с тем чтобы обеспечить положение, при котором все заинтересованные правительственные секторы учитывали бы проблемы охраны здоровья населения.

Странам необходимо определить политику в области охраны окружающей среды. Совешание подчеркнуло важность первичной профилактики и необходимость разработки механизмов для систематического определения первоочередности стоящих задач.

Следует укрепить координацию во всех правительственных секторах, которые могут влиять на санитарное состояние окружающей среды.

Оценка факторов риска

Крайне важным является вопрос оценки факторов риска. Рабочая группа одобрила содержащийся в отчете Консультативного совешания в Ульме принцип разработки рекомендаций и описание модели оценки факторов риска. Указанный процесс оценки факторов риска должен учитывать все виды воздействия, включая воздействие воды, воздуха, пищевых продуктов и рабочих условий, а также факторы риска микробиологического, физического, химического и социологического характера. Следует уделить внимание изучению потенциального воздействия на здоровье новых технологий, включая биотехнологию, а также новых видов изделий. Подчеркивалась важность оценки комбинированного и косвенного воздействия факторов риска. Группа также считает, что в оценке факторов риска должны участвовать представители различных дисциплин.

При оценке факторов риска необходимо применять холистический подход с учетом экономических, социальных и других факторов, некоторые аспекты которых могут иметь как благоприятный, так и отрицательный характер.

Необходимо укрепить научную базу, которая используется при оценке факторов риска.

Следует внедрить меры по более систематической идентификации потенциальных факторов риска, обусловленных появлением новых опасностей в окружающей среде.

Научные исследования

Происходящее сейчас развитие биологических наук окажет значительное влияние на санитарное состояние окружающей среды. На положение в этой области могут оказывать воздействие не только факторы, связанные с общей окружающей обстановкой и условиями труда, но и факторы, обусловленные образом жизни, питанием, жилищными условиями, стрессом, а также генетически приобретенные индивидуальные особенности.

Важнейшим фактором защиты здоровья от негативного воздействия окружающей среды являются защитные свойства организма. Есть данные, свидетельствующие о том, что укреплению этих защитных функций организма в значительной степени способствует правильное и адекватное питание.

Следует стимулировать изучение факторов, связанных с образом жизни, питанием, жилищными условиями, стрессом и генетически обусловленными функциями организма, который защищает его от воздействия токсичных веществ, способствующих ухудшению состояния внешней среды.

Необходимо предпринять усилия по расширению и координации клинических и эпидемиологических исследований, которые содействуют определению опасных факторов окружающей среды, в целях укрепления возможностей профилактической деятельности.

Следует развивать сотрудничество между медицинскими и биологическими науками в области окружающей среды как на национальном, так и на международном уровнях.

Необходимо внимательно проанализировать возможность использования ресурсов промышленности в целях развития научных исследований.

Обучение, подготовка и развитие взаимосвязей

Решение проблем охраны окружающей среды требует междисциплинарного подхода. Во многих областях ощущается нехватка соответствующим образом подготовленного персонала.

Население нуждается в более обширной информации о проблемах охраны окружающей среды, в частности, значении факторов, связанных с образом жизни, жилищными условиями, стрессом и т.п., особенно тех, которые касаются отношения к риску и его предупреждения.

Программы медицинских учебных заведений должны уделять больше внимания аспектам охраны окружающей среды.

Необходимо расширить подготовку в области токсикологии, эпидемиологии и соответствующих биологических наук.

Следует разработать специальные программы подготовки по методологии оценки факторов риска.

Следует содействовать тому, чтобы общественные учреждения информировали население о результатах оценки факторов риска. Такая информация, которая призвана расширить осведомленность населения, не должна вызывать у нее неоправданной тревоги.

Международная кооперация и сотрудничество

Европейское региональное бюро ВОЗ призвано сыграть важную роль в области охраны окружающей среды в странах Европейского региона, особенно это относится к сбору данных, их оценке и распространению.

Следует создать европейскую консультативную группу ВОЗ, многосекторальную и междисциплинарную по своему характеру, которая должна периодически собираться и вырабатывать рекомендации для Регионального бюро по всем аспектам охраны окружающей среды. Целесообразно созывать совещания консультативной группы в различных странах Региона в соответствии с принципом ротации.

Участники проявили интерес к идее создания междисциплинарного европейского центра ВОЗ по окружающей среде. Однако в ходе дальнейшего изучения данного предложения Группа пришла к мнению о том, что Региональное бюро должно собрать более подробную информацию об основных задачах и административных механизмах, а также соответствующих мерах, проводимых в настоящее время в Европейском регионе.

В связи с усилением значения проблемы охраны окружающей среды целесообразно выделить дополнительные финансовые и людские ресурсы на цели развития этой программной области в Региональном бюро.

Европейское региональное бюро ВОЗ призвано сыграть важную роль в активизации усилий стран и международных организаций по решению проблем, связанных с санитарным состоянием окружающей среды.

Все мероприятия Европейского регионального бюро ВОЗ по безопасности химических веществ должны осуществляться в строгом соответствии с Международной программой по безопасности химических веществ или, где это целесообразно, в ее рамках, с тем чтобы обеспечить оптимальные возможности для оказания содействия международным усилиям в области охраны окружающей среды.

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